

front saloon or reading-room contains such journals and periodicals of a general scientific character as are most in demand. The librarian's room contains mathematical journals, the society's own publications, and the various scientific catalogues and dictionaries. In the council-room the reports of scientific expeditions find a place, and the quarto volumes of the American and Indian Geological Surveys, and much of a connected nature. The back saloon has already been described. In the basement we find journals of zoology, botany and medicine, electrical engineering, meteorology, geodesy, geology, &c.

There are no book-cases in the meeting-room or reception-room, but on the second floor there are three fairly large rooms and one small room filled with books. In one we find periodicals and books bearing on geography, biography, philosophy, philology, in another astronomy, and in a third the literary weeklies, monthlies, and quarterlies.

This description is not, of course, exhaustive, for, besides the periodical publications, the Royal Society of Edinburgh possesses many books of historic value and antiquarian interest; also the complete works of famous men of science from Galileo down the centuries. It will serve, however, to show that, as regards the accessibility to their literary treasures, the society has distinctly benefitted by their change of location.

The reception-room on the first floor, where the fellows meet for tea and talk before the afternoon meetings and after the evening meetings, has been beautifully designed, largely under the advice of Sir George Reid.

The least satisfactory of all the arrangements is the meeting-room for the reading of papers, but it is difficult to see how anything better could have been done. The lecture table, with gas fittings, occupies part of one of the long sides. The lantern-screen partly covers the black boards on the wall behind, the lantern being ensconced in a niche in the opposite wall. The hangings and decorative busts have practically killed the echo which was heard when the room was first tried. Yet to the many fellows who remember what used to be, the present arrangement lacks a certain undefinable flavour of old-world dignity. There is too much of the modern lecture-room and too little of the feeling of a scientific and literary society met for the interchange of views.

In other respects, however, the society has gained much by its removal from the limited space at its disposal in the Royal Institution to the spacious accommodation in George Street. Its remarkable collection of portraits and busts can now be seen to advantage, and the ready accessibility to its valuable library of books and periodical literature in all departments of science and in many departments of philosophy and art cannot but confer a great boon to the fellows and others engaged in research work.

The reception on Monday night was a large gathering, representing all phases of national life, such as Parliament, the Church, the Bench and the Bar, other legal bodies, the Scottish universities and leading educational institutions, the Royal Academy, municipalities, parish councils, &c.

#### THE INTERNATIONAL INVESTIGATIONS IN THE NORTH SEA AND THE SCOTTISH BOARD'S ANNUAL REPORT.<sup>1</sup>

SIX years have now elapsed since the commencement of the international fisheries' work by the seven nations concerned, and with the bulky literature and masses of tables and plates in hand it may be thought that now a stage has been reached which will demonstrate one way or another the position of the sea-fisheries, especially as it was stated that results of importance were early to be forthcoming. Yet in scanning the various publications no

very definite general conclusions are apparent, and the question of primary importance to this country remains—excepting the statistics of the bureau—as far from solution as ever. To take the publications in the order above-mentioned, the first is Dr. Kyle's important statistics of the North Sea fisheries for 1906. So far as can be observed, the total of the sea-fisheries of each nation shows an increase both in quantity and value on the previous year (1905), with the exception of Ireland. In the case of such fishes as the cod and the haddock, the ever-recurring variability displays itself in an increase of both in Denmark and the Netherlands, a diminution in Germany, an increase of cod and a diminution of haddock in Belgium, an increase of cod in Sweden, and a great increase of the same fish in England and in Scotland. Along with this is a considerable diminution of plaice in Sweden, England, and Belgium, and a considerable increase in Scotland and the Netherlands, a great increase in Denmark, and a nearly stationary condition in Germany. Dr. Kyle points out, however, that this decrease is due to a diminished capture of the smaller sizes of plaice (*e.g.* in England, Holland, Germany, and Belgium). Much has been written about the decrease of the lemon-dab (or so-called "lemon sole") in Scottish waters, yet in 1908 it brought 70,134*l.*, or 1400*l.* more than in the previous year. In the same way, whilst the sole and the turbot vary in the different nations, the dab remains stationary in Scotland, where it was supposed by its increase to be ousting the plaice. These statistics, which cover a much wider area than it is possible to allude to here, are perhaps the most important result of the international scheme, and they show how uncertain and variable sea-fishing is. Moreover, they demonstrate that whilst in one country the capture of a species may temporarily be diminished, in another it is increased. The comparative constancy of the totals and the large amount of fluctuation in individual species are points emphasised by Dr. Kyle. Further, no Continental nation approaches the share taken by Britain in this industry, England having 39 per cent. and Scotland 34 per cent. as their respective shares, the nearest being Holland with 12 per cent., Germany having only 4·7 per cent.

The report of the International Council between July, 1907, and July, 1908, is chiefly occupied with the record of changes in the *personnel* and an epitome of the seventh annual meeting at Copenhagen. It is noteworthy that the council is still in want of information concerning important fishes, such as the plaice, flounder, and other flat fishes, the haddock and other gadoids, and the herring and mackerel of the North Sea. Anything like finality in its labours seems as far distant as ever, yet hydrographical and "plankton" work still hold it. Prof. Garstang, moreover, gives an interesting account of the distribution of the plaice in the North Sea, Skagerak, and Kattegat according to size, age, and frequency, no fewer than 2048 hauls of the trawl and 327,000 examples of plaice having been dealt with; yet the decline in the returns from Sweden and Belgium after 1904, and from Scotland after 1905, must seriously affect the scope of the results. In regard to general distribution, the facts corroborate those elicited in 1884,<sup>1</sup> viz., the occurrence of small plaice in shallow water and of large in the deeper water, with a constant interchange between the two areas. Yet it is impossible to establish a hard-and-fast correlation between the size of the plaice and depth. The very general distribution of this species over the North Sea is a further guarantee for its safety. Mention is made of "dense" accumulations of plaice in the "protected Scottish Firths," but such accumulations were there before protection existed. It is stated that from fifteen to twenty plaice of 35 cm. were caught per hour in the inner part of St. Andrews Bay, information which will cheer the fishermen there, since for thirty years at least the uniform sizes caught for sale have been from 10 inches to 13 inches. The idea that many large plaice leave the Firth of Forth and enter St. Andrews Bay during the autumn, thereafter proceeding to deeper water to spawn, and again swell the ranks in the Forth, is in need of confirmation. Similar remarks apply to the changes noted in the large plaice

<sup>1</sup> Conseil permanent international pour l'Exploration de la Mer.

Bulletin statistique des Pêches maritimes des Pays du Nord de l'Europe, vol. iii. pour l'Année 1906. Pp. 83. (Copenhagen: A. F. Høst and Fils, 1909.)

Rapports et Procès-verbaux des Réunions, vol. xi., Juillet, 1907–Juillet, 1908. Pp. xxv+176+51. (Same publishers, 1909.)

Rapports, &c., vol. x., Rapport sur les Travaux de la Commission dans la Période 1902–7. (Same publishers, 1909.)

Twenty-seventh Annual Report of the Fishery Board for Scotland for the Year 1908. Part i., General Report. (Edinburgh: Oliver and Boyd.)

<sup>1</sup> Scientific Trawling Report, pp. 21, 25, 43, 76, &c., 1884, and in General Report, 1885, correspondingly.

of the Moray Firth. Minimum captures on the inner areas or outer "deeps" are not necessarily connected with "migrations." The remarkable oscillations described as occurring in the small plaice of the eastern area of the North Sea, viz. that they pass outward and again "work their way backward" inshore, would have been less phenomenal and would not have required the aid of "hibernation" if researches on the same size on the western shores (British) had been systematically carried out, along with an inquiry into the early post-pelagic and subsequent stages below the sizes selected. Migrations, indeed, loom largely in the international work, even to the supposition that the cat-fish (*Anarrhichas*) is as regularly migratory in the spring as the hake is in autumn. Moreover, large plaice were common in the Moray Firth before its closure, and are still there, the smaller finding ample scope in the shallows and the larger sufficient depth within the area. In regard to seasonal changes in the stock of plaice, it has long been known that captures in mild weather are greater, and that a cold, frosty morning diminishes them, but it does not follow that such captures give trustworthy information as to "maximum and minimum densities." The changes on the various "banks" naturally follow the spreading of the younger plaice seawards, but "hibernation" of small plaice and immigration of large, mature fishes rest largely on conjecture, as does also the notion, marking notwithstanding, that large numbers of mature fishes "migrate from the north for spawning purposes." The supposed scarcity of large plaice in the deeper water in winter may be due to other causes than migration, though congregation for spawning purposes is reasonable. Mr. Hefford's paper on the proportionate distribution of the sexes of plaice in the North Sea does credit to his ability, but his conclusions would need the support of longer experience, especially as a large inner area, viz. from Montrose to Kinnaird Head, has been omitted. The notion that the proportion of sexes of plaice may yet indicate the intensity of trawling in a given region is scarcely warranted.

Vol. x. consists of a bulky report dealing with the whole period (1902-7). It reiterates the problems to be solved and the methods followed by the administrative committee, with a summary of the results, besides a series of special reports by seven responsible authors. Some of these reports have previously been published, and have received attention elsewhere, so that they need not be alluded to. In the summary of the results the administrative body deals first with the depths and hydrography of the oceanic regions investigated. Then the spawning conditions and spawning places of the gadoids (seventeen in number) are considered, and it is to be noted that the investigation of both is now held to be complete, a view some may doubt, considering the scattered cruises of the steamers, and when on the next page it is stated that the spawning places cannot always be given with absolute certainty. The summary is full of interest, but in the case of several species the limitations given by the committee need re-investigation, and, for instance, no differentiation of the areas of the British coast has been attempted as regards the cod. The third head treats of the "natural conditions in the spawning regions," and an effort is made to connect temperature and salinity with the spawning process. The gadoids, however, are not the only fishes in these waters, and there is perhaps little more in the matter than that an Arctic, a temperate, and a tropical fish finds—each in its own waters—the most suitable spawning conditions. Besides, the refinements of temperatures and salinities, however interesting scientifically, count for little in the main question put before the investigators by the British Government. It was well known that wherever the conditions of life were suitable, there the pelagic larvæ and young fishes were found with great regularity, irrespective of currents, temperatures, and salinities. No current is known which will take the larval cod with unfailing regularity in one direction and the haddock in another, which will keep the larval dabs and top-knots often in deeper water whilst the plaice is with unfailing accuracy sent to the margin of the beach. No currents, temperatures, or salinities will explain why in 1908 the herring fishing was very successful in the northern Scotch area and less successful in the southern,

and why in 1909 exactly the reverse was the case. In this connection, Schmidt also gives no reason why the ova and fry of *Gadus luscus* are not carried far from their spawning place. What can those familiar with the subject make of the following:—"According to the spawning time, first the cod eggs, then the haddock eggs, and lastly the whiting eggs are involved in the movement of the currents"? It has not been shown that the currents which distribute the eggs of the pollack and the poor cod in the Atlantic in spring have their equivalents in the summer when the same fishes spawn in the North Sea, though there is little fear as to the safety and distribution of the eggs of these and all other marine fishes. The guarded remarks of the committee are therefore warranted, viz. "the investigations we are discussing here are far from being able to solve so great a problem." Especially does this apply to the notion that all the young green cod which swarm on the Scottish coasts have been spawned on the North Sea bank, and that the cod makes long migrations for the purpose of spawning.

On the important problem of sea-fish hatching the committee make very cautious remarks, basing their views mainly on Knut Dahl's paper. In this it is shown that in small Norwegian fjords where cod spawn the captures by tow-nets were not influenced to any extent by the addition of thirty millions, and that the captures varied much in different years. No difference also was noticed in the quantitative occurrence of young littoral fishes each year. They found no proof of an increase of local stock by artificial hatching, but they do not discourage further experiments. The foregoing is in marked contrast with the results of Fulton in the upper waters of Loch Fyne, where shore-fishing with a push-net found an increase of young plaice during the six years in which 141 millions of young plaice were added, as compared with the following six, in which none were added. Yet in glancing at his figures it would appear that in four of the years in which none were added the average captures per hour compare favourably with those in which millions were put in, and, further, that a fifth year is second highest on the list even of the favoured years. The chances of error in work carried out in the circumstances, and the great variation from eight to 112 per hour when no addition was made, combine with other points to render this experiment in need of confirmation.

Seventy pages are devoted by the administrative body to the distribution, growth, and migrations of the older stages of the important food-fishes, and to some practical fisheries questions in the light of the results obtained. Under the former head the cod, haddock, and whiting alone are dealt with, the ages being determined by measurements by Helland Hansen, who finds little variation in the numbers of large and extra large haddocks during the years of investigation, and by the rings on the scales by Damas, whose prolix paper might well have been abbreviated. The reliance on the catches, for instance, of the haddock, in the deeper water of the North Sea as proving migration is open to question, and the remark by the administrative body that the reporters are not warranted in explaining the "marked" seasonal migrations, some of which are connected with the occurrence of shoals of herring, is safe.

One of the most interesting and important contributions is that of Johs. Schmidt, on the distribution of the pelagic fry of the gadoids and the spawning regions of the gadoids in the North Atlantic from Iceland to Spain. He lays, however, too much stress on his experiences of Icelandic currents in treating the conditions in the North Sea, and shows too evident a tendency to make out a case for the hydrographer.

Of the Scottish Board's report, it need only be said that it proves the prosperous condition of the Scottish fisheries, for though the total does not reach that of the previous year (1907), yet the deficit is due solely to herrings, the "catch" of other fishes being greater in 1908 than in 1907. It is a decade since the ruin of the lemon-dab ("lemon sole" of the Board) was in sight, yet the "catch" of this fish exceeded by almost 1200 cwt. that of 1907, when the record did not vary much from the preceding years. It is sometimes forgotten that the amount of flat fishes rises or falls according to the amount of



energy expended in their capture, not because any noteworthy change has occurred in their numbers.

To sum up the international work, then, it would seem that considerable waste of energy and funds is caused by the re-publication of papers, and by the manner in which several of these overlap. Moreover, it is beyond the scope of science to enter into a disquisition on the fluctuations of the market-price of fishes. It is also noteworthy to find that, after seven years' work, the council now see the magnitude of their task and the absence of finality in their labours. There is no sign of "impoverishment"; on the contrary, their cautious words lean to the opposite view. The committee recommend continuation of their labours, basing this on the fact that various nations share in the North Sea fishing, and that no action could be taken without the consent of the other countries; but as to any important result to be gained by the fisheries there is silence, for it cannot be supposed that hydrography, the collection of fish-food and bottom deposits, can do duty any longer as necessary measures for the welfare of the North Sea fisheries.

W. C. M.

### THE ASSOCIATION OF TEACHERS IN TECHNICAL INSTITUTIONS.

AT the fifth annual meeting of the Association of Teachers in Technical Institutions, held on Saturday, November 6, Mr. J. Wilson, of the Battersea Polytechnic, president of the association, in moving the adoption of the annual report, reviewed the year's work. In the course of it he laid special stress upon the very important step taken by the association, at its conference at Liverpool, in putting forward a definite series of resolutions relating to educational reforms which appear to them as teachers to be essential to the continued progress of technical education. In these resolutions the association expresses its opinion that it is necessary to raise the school-leaving age to fifteen years; it asks that special attention be given to the teaching, in primary schools, of elementary science, practical arithmetic, and manual training; it calls for complete coordination of the work of the evening continuation schools with that of the evening technical schools; it asks for the provision of technical-secondary schools, including trade schools, with a generous system of scholarships, including allowance for maintenance; and, finally, it endorses the recommendations of the Minority Report of the Poor Law Commissioners respecting compulsory attendance of boys for technical instruction for not less than thirty hours per week. Thus a very definite policy in some important educational problems affecting technical education has been taken up by this association.

Another important, and in this case non-controversial, action is now being broached by this body of teachers. It suggests the desirability of holding a series of "round table" conferences between accredited representatives of primary, secondary, and technical teachers, with the object of discussing the possibility of reforms in the curricula and methods of work in the schools, from the point of view of the needs of the pupils who at a later stage pass on to the technical schools. Most urgent is the necessity for such conferences in the case of the primary and technical teachers, in order that they may arrive at a mutual understanding of the needs of the pupils and the possibility of meeting them, because in the majority of cases where pupils receive any formal teaching after the primary-school work, it is to the technical teachers that they come for it. Such conferences abound with immense possibilities for the benefit of education in all its phases. Broader and more complete knowledge of each other's branch of work and its needs and possibilities must necessarily result, and as a consequence many apparent difficulties in the way of making the educational work in the two or three types of school truly continuous, without unnecessary overlapping, will be removed. The better knowledge of each other's work will remove some prejudices and bring about the necessary unanimity of action in those matters which affect the teachers individually and as a class, such as conditions of service, security of tenure, and superannuation for all classes of teachers; these views being held by the association, it is all but unnecessary to

point out to any other class of teachers, who have the duty, responsibility, and honour of teaching the pupils in their earlier years, that criticisms made by this association on the preparation of those pupils for later technical studies is not directed at the teachers, but at the systems imposed upon them, in which ideas, good in themselves, are allowed such sway as to mask the greater essentials of elementary-school work.

In 1888 Parliament passed a Technical Education Act, and for the past twenty-one years progress has been vigorous and rapid. Nevertheless, technical education has touched only a very small fraction of the enormous mass of material represented by the workers of all grades in the industries of the country. We can only regard it as having entered upon its duties, and must look forward to dealing with much larger numbers of students and to a greater range of work. There are two chief factors which may assist in bringing in much larger numbers of the young workers. The first of these is the increasing interest and help of the employers. Efforts in this field have so far produced but scanty results, and the association as a body is not very hopeful of this field. The second factor, to which the association looks with greater hope, is some form of organised effort by the State to achieve the following ends:—

- (a) Elementary education to be made more real and practical; less "bookish," without diminishing its cultural value.
- (b) The establishment of some system of compulsory attendance for continued education for all between the ages of fourteen and seventeen years.
- (c) The linking together of the three main grades of educational effort.
- (d) The complete coordination of the work of the evening continuation schools with that of the evening technical schools.

It is agreed by many observers, within and without our technical institutions, that technical education is rapidly approaching a crisis in so far as its higher work is concerned in the London polytechnics. The special feature of the moment is the relation of technical institutions to the university colleges. The association holds the opinion that there is room and to spare for the activities of both in those phases of their work which are common, and fully recognises that each has its own special function. It claims that the opportunity for complete study should be within the reach of every capable student, and that, too, in a sympathetic atmosphere. There is visible at the present time, both in London and the provinces, a tendency, under the guise of coordination, to curtail this higher work in both science and technology in these technical institutions, and thus to reduce seriously the students' opportunity. This tendency, if carried into effect, would be disastrous, under present social conditions, to the highest interests of national education, especially as regards the evening students.

H. ADE CLARK.

### AN ORNITHOLOGIST IN QUEENSLAND.

IN June last the editors of the *Emu* issued a special number (vol. viii., part v.) containing a very interesting account, by Mr. S. W. Jackson, of a trip to northern Queensland in search of the nest and eggs of the tooth-billed bower-bird (*Scenopastes dentirostris*). The expedition was undertaken on behalf of Mr. H. L. White, and appears, in spite of many difficulties, to have been eminently successful in the attainment of its object. The exploration of the tropical forests of Australia is by no means devoid of danger. Mr. Jackson himself was laid up for a week with "Johnstone River fever," which he regards as the almost inevitable price of his wanderings in the moist, fever-stricken scrubs, and one of his natives was killed by the falling branch of a tree, while the "scrub-itch mites" appear to constitute a plague of no mean order. It was a long time before he succeeded in obtaining the nests and eggs of the tooth-bill, though the playing-grounds were met with in great abundance.

A detailed, though unfortunately somewhat disconnected, account is given of the habits of these truly remarkable birds. They were first observed shortly before the commencement of the breeding season, each one occupying his